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(11) Publication number:

0 046 617  
A1

(12)

## EUROPEAN PATENT APPLICATION

(21) Application number: 81200905.8

(51) Int. Cl.<sup>3</sup>: F 16 L 59/12  
//B29D23/10, B29C27/00

(22) Date of filing: 14.08.81

(30) Priority: 27.08.80 NL 8004849

(43) Date of publication of application:  
03.03.82 Bulletin 82/9

(84) Designated Contracting States:  
AT BE CH DE FR GB IT LI LU NL SE

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(54) Spacer means for an insulated plastics pipe and composite pipe.

(57) A spacer means (1) of thermoplastics material for keeping a tubular covering (16) in a spaced relation to a central feed pipe (14) comprises two first legs (2,3) engaging a feed pipe (14), said first legs (2,3) being interconnected by a U-shaped connecting part (13). The free ends of the spacer form spacing parts (4, 5) and together with U-shaped connecting part (13) the tubular covering (16) of polyethylene can be kept in spaced relation to the feed pipe (14).

The spacer means (1) may be provided with second legs (36, 37) for engaging a return pipe (35).

A composite pipe comprises a tubular covering (16) held at distance from a central feed pipe (14) by means of a spacer means 1, the space between covering (16) and feed pipe (14) being filled with a plastics foam (15).

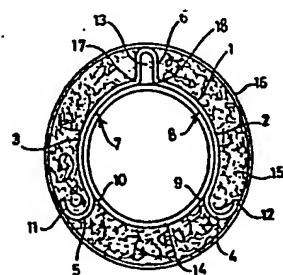


FIG.: 2.

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Spacer means for an insulated plastics pipe and composite pipe

The invention relates to a spacer means for keeping a tubular covering in spaced relation to a central pipe.

Such a spacer means is known for a central pipe surrounded  
5 by a polyurethane foam plastic layer which is covered by a  
tubular casing usually consisting of polyethylene.

Said known spacer means consists of two concentric rings  
interconnected by means of spokes.

10

A disadvantage of this known spacer is that this spacer has  
to be pushed onto a central pipe from one end which cannot  
possibly be achieved in case of central pipes of very great  
length, especially in case of central pipes of a strongly  
15 postcrystallizing plastic, such as polybutylene, which are  
currently used for conveying heating fluids for the central  
heating of buildings and houses. Central pipes of such a type  
made of a strongly postcrystallizing plastic, such as poly-  
butylene, actually present the great advantage that they can  
20 be installed in great lengths without sealed joints having  
to be applied, since the pipe is sufficiently flexible so as  
to be adaptive to any unevenness or desired bend.

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It is an object of the present invention to provide a spacer means of the aforementioned type, which does not show said disadvantage as the spacer need no longer be pushed upon a central pipe from a free end, but can be fitted directly onto the central pipe at any location.

This object is attained according to the invention in that the laterally open spacer means is provided with at least one resilient displaceable part so as to enable a pushing of the 10 spacer over a central pipe when fixing it onto said central pipe.

An advantageous embodiment of a spacer means according to the present invention is characterized in that the spacer means 15 comprises a resilient displaceable part for clamping the latter onto a central pipe.

A spacer according to the invention comprises advantageously two opposed resilient legs, said legs carrying protruding 20 spacing parts, as well as at least one additional protruding spacing part being preferably disposed symmetrically with respect to the two other spacing parts.

By using a laterally open spacer having a resilient displaceable part, said spacer may be easily pushed onto a central pipe from above, thus affording the spacer to be fastened, 25 preferably in a clamped relation, onto the central pipe.

Each resilient leg advantageously comprises cylindrical 30 sections forming part of one cylinder surface and being capable

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to cooperate with the central pipe.

Thus, an optimum cooperation between the spacer means and a central pipe is obtained while ensuring a flawless positioning  
5 of the spacer on the central pipe.

The ends of the cylindrical parts are appropriately provided with spacing parts bent outwardly which preferably carry extremities also bent outwardly.

10

Preferably, the other ends of the cylindrical sections are interconnected through a U-shaped connecting piece.

15 The invention will now be illustrated with the aid of an embodiment in <sup>the</sup> accompanying drawing, wherein:

Figure 1 is a view of a spacer means according to the invention on a central plastics pipe;

20 Figure 2 shows the manufacture of a spacer starting from a profile of the spacer and fitting the spacer onto a central pipe;

Figure 3 shows a device for surrounding a central pipe with a covering so as to inject a foaming plastics composition, and

25 Figure 4 shows a view of a modified spacer means according to the invention on a central supply pipe and a central return pipe.

Figure 1 shows a plastics spacer means 1 which is open at its  
30 lower end and which comprises two opposed resilient first legs 2 and 3. The first legs 2 and 3 carry protruding spacing

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parts 4, 5, while one additional other protruding spacing part 6 is symmetrically disposed with respect to said protruding spacing parts 4 and 5.

- 5 The spacer 1 is disposed on a central feed pipe 14 of polybutylene or of another polyolefin, which is covered with a foam plastics layer 15 of polyurethane foam, the polyurethane foam layer 15 in turn being covered with a polyethylene covering 16 which, however, may also consist of a layer of
- 10 paper around which a polyethylene covering is then subsequently provided.

A spacer means 1 preferably comprises two cylindrical sections 7, 8 which at their free ends 9, 10 are bent towards the outside thereby forming bent spacing parts which also comprise outwardly bent extremities 11 and 12.

- 15 At their other ends 17 and 18, the cylindrical sections 2, 3 are interconnected by a U-shaped connecting part 13. When
- 20 manufacturing such a spacer from a plastics material, such as preferably a polyamide, for example nylon, the U-shaped connecting part 12 will impart a good resilience to the legs 2 and 3, so that the spacer can be easily pressed and secured onto a central pipe 14, from above.

25

Figure 2 shows a plastics profile 19 from which the spacer means 1 are formed. To this end a plastics profile 19 is supplied through a channel-shaped support 20. The end portion 21 of the plastics profile 19 is placed over guide means consisting of two guide plates 22a, 22b, along which a spacer separated from the end portion 21 of the plastics profile 19

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by means of saw 23, can be moved to a central pipe 14 and be fitted thereon. In order to separate a spacer 1 from the end portion of the plastics profile 19 there is provided a displaceable mandrel 24 which supports the end portion 21 during  
5 sawing, so that, after having sawn through the plastics profile 19 a spacer 1 is supported by the mandrel 24.

By pulling away mandrel 24, a spacer 1 will be able to move downwards along the guide plates 22a, 22b.

10

In order to be able to subsequently press a spacer 1 onto a central pipe 14, a pressure member 25 presses upon a spacer 1 in such a way that the first legs 2 and 3 resiliently move from each other and the cylindrical sections 7 and 8 are  
15 allowed to adjoin the outer wall of the central pipe 14.

Figure 3 shows a central polybutylene pipe 14 surrounded by a covering 16 from paper, said covering being kept in a concentric relationship with respect to the central pipe, as a  
20 result of the spacer means 1 described hereinbefore.

The latter tubular covering 16 is obtained by feeding a guide bush 28 comprising an open slot 27 with a web of paper 26 via a guide roller 33 and by gluing together the overlapping edge  
25 parts 29a, 29b of said paper web. A proper joining of the edge parts 29a, 29b is obtained by means of two endless bands 30 and 31 cooperating with each other. A roller 32 presses the edge parts 29a, 29b respectively, which have been glued together, upon said covering 16.

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A foaming composition is injected into the space provided

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between the central polybutylene pipe 14 and the covering 16, by means of a feed pipe 34, whereafter the composition is foamed.

- 5 The central pipe 14 provided with the foam layer 15 and covering 16 is then conveyed by appropriate means (not shown).

Figure 4 shows a plastic spacer means being open at its lower end, which comprises two opposed resilient first legs 2 and 3.

- 10 The legs engage a central supply pipe 14.

Through an intermediate resilient part 38 the legs 2 and 3 are connected with second resilient legs 36 and 37. These second legs which form part of a cylinder engage a central

- 15 return pipe 35.

The second legs 36 and 37 are connected with protruding spacing parts 4, 5 carrying outwardly bent extremities 11 and 12.

- 20 It should be noted that in this embodiment the spacing parts 4, 5 are rather flat parts, whilst the spacing parts 4, 5 of the embodiment according to fig. 1 are bent parts.

- 25 This spacer allows the production of a feed pipe 14 and a return pipe 35 as one assembly surrounded by a foam insulation.

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CLAIMS

1. Spacer means for keeping a tubular covering in a spaced relation to a central pipe,  
characterized in that  
the laterally open spacer means (1) is provided with at least  
5 one resilient, displaceable part, so as to enable pushing of  
the spacer means over a central pipe (14, 35) when fixing it  
on to said central pipe.
  
2. Spacer means according to claim 1, characterized in  
10 that the spacer means (1) comprises a resilient, displaceable  
part clamping the latter on to a central pipe (14).
  
3. Spacer means according to claims 1 or 2, characterized  
in that the open spacer comprises two opposed resilient legs  
15 (2, 3) said legs (2, 3) carrying protruding spacing parts (4, 5)  
and at least one additional protruding spacing part (6) being  
provided.
  
4. Spacer means according to claim 3, characterized in that  
20 the additional protruding spacing part (6) is symmetrically  
disposed with respect to the protruding spacing parts (4, 5).
  
5. Spacer means according to claims 3 or 4, characterized  
in that each resilient leg (2, 3) comprises cylindrical  
25 sections (7, 8) forming part of one cylinder surface and being  
capable of cooperation with a central pipe (14).
  
6. Spacer means according to any one or more of the preceding claims, characterized in that the resilient legs (2, 3)  
30 or cylindrical sections (7, 8) comprise at their free ends

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(9, 10) outwardly bent spacing parts (4, 5) which are preferably provided with outwardly bent extremities (11, 12).

7. Spacer means according to any one or more of the preceding claims, characterized in that the other ends of the resilient legs (2, 3) or cylindrical sections (7, 8) are interconnected through a U-shaped connecting part (13).

8. Spacer means according to any one or more of the preceding claims, characterized in that the spacer means consists of a thermoplastics material, more preferably of a polyamide.

9. Spacer means according to any one or more of the preceding claims, characterized in that the spacer means (1) comprises second resilient legs (36, 37) being capable of engaging a return pipe (35), said second legs being connected with the first legs (2, 3) preferably by an intermediate part (38).

10. Composite pipe consisting of at least a central plastics pipe (14, 35), especially made of a strongly postcrystallizing plastic, surrounded by a tubular covering which is kept in a concentric relation with respect to the central pipe by means of at least one spacing means, the space provided between the central pipe and the tubular covering being filled with a plastics insulating material, characterized in that a spacer means (1) as claimed in any one or more of claims 1 to 9 is used.

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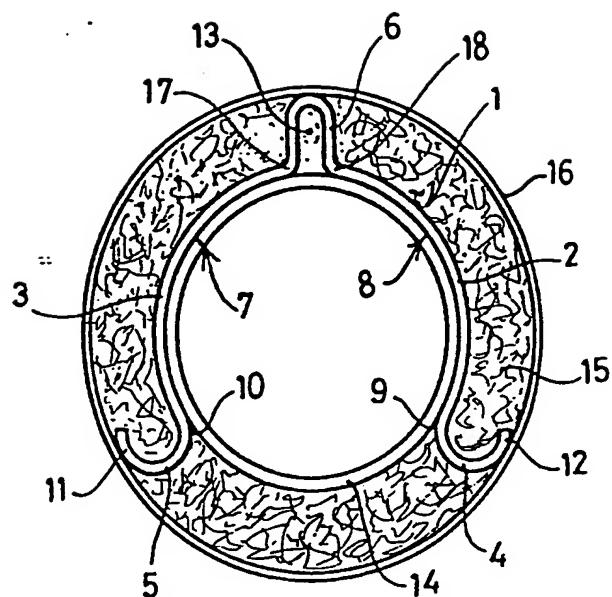
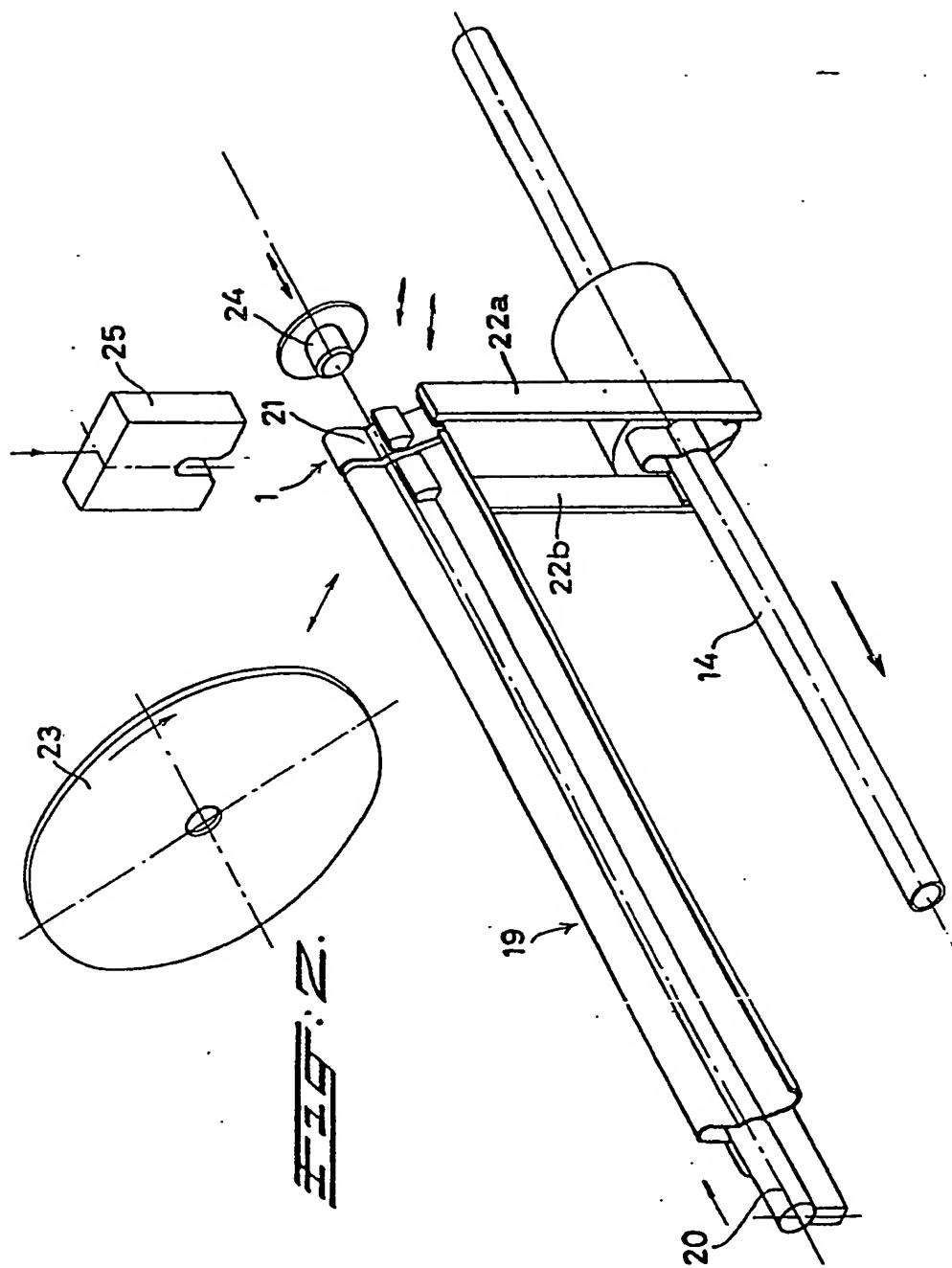


FIG. 1.

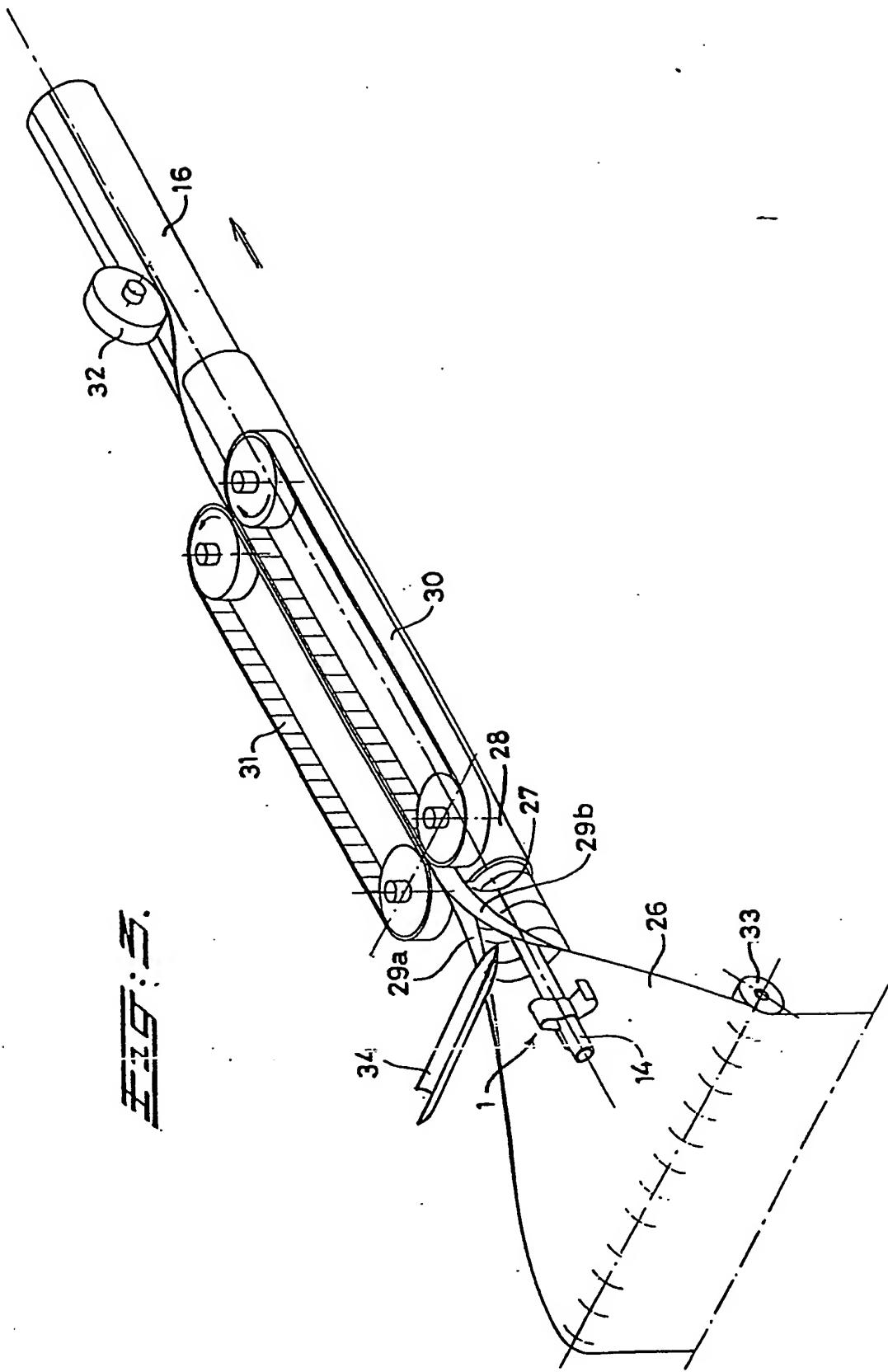
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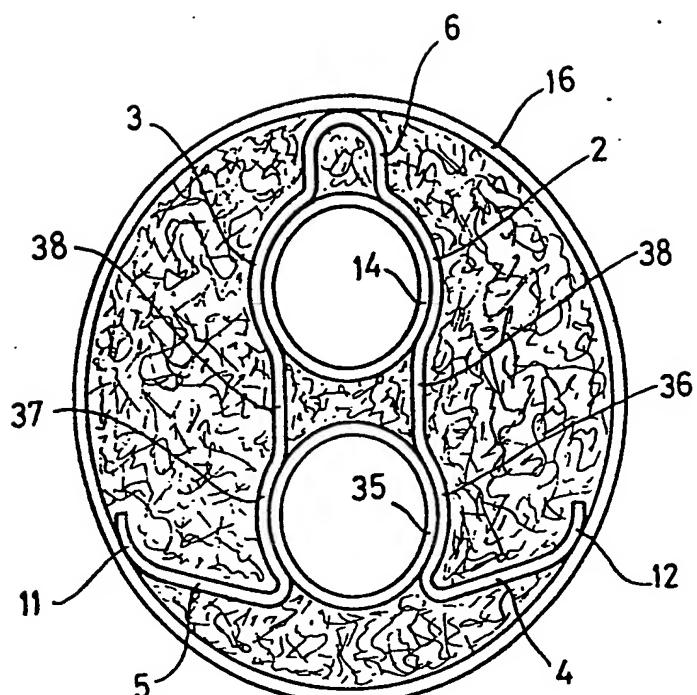


FIG: 4.

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## EUROPEAN SEARCH REPORT

Application number

EP 81 20 0905

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>US - A - 3 782 452</u> (CEPLON) * Column 2, line 51 - column 3, line 68 *	1-7, 9, 10	F 16 L 59/12// B 29 D 23/10 B 29 C 27/00
X	<u>US - A - 3 650 579</u> (SABLE) * Column 1, line 55 - column 3, line 76 *	1-3, 5, 6, 10	
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	<u>FR - A - 1 076 473</u> (MAISON) * Figure *	1, 3, 6	TECHNICAL FIELDS SEARCHED (Int. Cl.)
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	<u>DE - A - 2 823 101</u> (GUTEHOFFNUNGS- HUTTE) * Column 5, line 27 - column 6, line 23 * & US - A - 4 240 850	8	F 16 L
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P	<u>US - A - 4 250 927</u> (NEWBURG) * Column 4, line 6 - column 5, line 14 *	1-7	
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A	<u>FR - A - 2 334 042</u> (GUTEHOFFNUNGS- HUTTE) * Page 1, line 40 - page 3, line 13 * & GB - A - 1 522 236	10	CATEGORY OF CITED DOCUMENTS
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A	<u>EP - A - 0 018 048</u> (WAVIN) * Claims 1, 4 *	10	X: particularly relevant A: technological background O: non-written disclosure P: Intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
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The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search	Date of completion of the search	Examiner	
The Hague	18-11-1981	ATKINS	